

CLAIMS

What is claimed is:

1. A system for merging a plurality of connections that
2 share a same class of service into a single virtual circuit
3 (VC) connecting a first switching node to a second
4 switching node in an Asynchronous Transfer Mode (ATM)
5 network, said system comprising:

6 a data buffer for storing cells that constitute a
7 packet received by a switching node;

8 a queuing apparatus comprising:

9 a plurality of connection queues associated
10 respectively with each of said plurality of connections;
11 and

12 a scheduled queue corresponding to a particular class
13 of service, wherein contents of said plurality of
14 connection queues are transferred into said scheduled queue
15 before being transmitted on said VC;

16 a reassembly queue control block (RQCB) associated
17 with each of said plurality of connection queues, wherein
18 said RQCB defines a chain of buffer control blocks, wherein
19 each buffer control block corresponds to a cell belonging
20 to a packet transmitted in a particular connection, and
21 wherein said buffer control block includes a next buffer
22 address in said data buffer and a lock bit that is normally
23 set to 1 for an incoming cell and is set to 0 for an

25 incoming cell only if said incoming cell is a last cell of
26 said packet; and

27 a scheduled queue control block (SQCB) associated with
28 said scheduled queue to which said chain of buffer control
29 blocks is transferred in response to a determination that
30 said lock bit of a cell stored within said data buffer is
31 set to 0, wherein a corresponding buffer control block is
32 chained to said chain of buffer control blocks in said SQCB
33 without having been previously queued in said RQCB.

1 2. The system of claim 1, wherein said plurality of
2 connections includes several sets of connections wherein
3 each set of connections is associated with different
4 classes of service, and further comprising a merged VC
5 scheduler for scheduling a transmission of cells from said
6 scheduled queues that are respectively associated with said
7 alternate SQCBs in accordance with said different classes
8 of service.

1 3. The system of claim 2, wherein said merged VC
2 scheduler includes processing means for scheduling cell
3 transmission based upon a priority order of said different
4 classes of service.

1 4. The system of claim 3, further comprising locking
2 means for locking cell transmission from a scheduled queue
3 associated with a SQCB until said scheduled queue has
4 received a last cell of an entire packet.

1 5. The system of claim 4, wherein said locking means
2 unlocks said merged VC scheduler in response to a lock bit

3 of a buffer control block that corresponds to a cell to be
4 transmitted is set to 0.

1 6. The system of claims 1, further comprising an aging
2 mechanism that is periodically activated for discarding
3 cells that are currently enqueued in a queue associated
4 with a RQCB in response to no cell having been enqueued in
5 said RQCB during a predetermined period of time.

1 7. The system of claim 6, wherein said RQCB further
2 includes an aging bit, wherein said aging bit being
3 automatically set to 0 in response to a first cell being
4 enqueued in said RQCB.

8. The system of claim 7, further comprising:

processing means for periodically activating said
aging mechanism being to discard cells enqueued in said
RQCB in response to said aging bit being set to 1; and

processing means for setting said aging bit to 1 in
response to said aging bit being previously set to 0.

1 9. The system of claim 1, further comprising a connection
2 control block is associated with each connection to be
3 merged within said VC, wherein said connection control
4 block includes an address of a RQCB utilized to assemble
5 packets corresponding to said connection.

1 10. The system of claim 9, wherein said connection control
2 block further comprises processing means for enqueueing
3 cells corresponding to said RQCB in accordance with an
4 address of a SQCB associated with said connection.

1 11. The system of claim 9, wherein said connection control
2 block further includes a discard flag bit for indicating
3 that a packet in progress is being discarded.

1 12. The system of claim 11, further comprising an early
2 packet discard processing means for setting said discard
3 flag bit in said connection control block in response to
4 activation of said connection control block and for
5 discarding cells of an incoming packet in response to said
6 early packet discard means being activated prior to said
7 connection control block receiving a first cell of said
8 incoming packet.

1 13. The system of claim 11, further comprising a partial
2 packet discard processing means for setting said discard
3 flag bit in response to activation of said connection
4 control block, and for purging said RQCB by deleting the
5 presently enqueued and following cells of an incoming
6 packet.